NON-PUBLIC?: N
ACCESSION #: 8808250243
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Hope Creek Generating Station PAGE: 1 of 4

DOCKET NUMBER: 05000354

TITLE: Manual Scram Following Loss Of Circulating Water Pumps Due To Malfunction Of Circulating Water System Multiplexer - Equipment Failure
EVENT DATE: 04/30/88 LER #: 88-012-01 REPORT DATE: 08/10/88

OPERATING MODE: 1 POWER LEVEL: 055

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: A.M. Ervin, Lead Engineer - Technical TELEPHONE #: 609-339-5239

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On April 30, 1988 at 0550 hours, the Plant was in OPERATIONAL CONDITION 1 (Power Operation) at 100% power generating 1085 MWe when the Circulating Water System began to experience spurious pump discharge valve closures and pump trips. At approximately 0850 hours both 4.16 KVA unit substation Circulating Water System infeeds tripped, placing all Circulating Water System pumps in emergency trip condition. The reactor was manually scrammed at 0852 hours. The Main Steam Isolation Valves (MSIV) were closed at 0938 hours. All Reactor Feed Pump Turbines were tripped. With the Main Condenser isolated, High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) were placed in service. While both HPCI and RCIC were running, a high reactor water level trip occurred, reactor pressure increased and a Safety/Relief Valve (SRV) lifted. On the subsequent SRV closure, reactor water level shrank to level 3 and generated an automatic scram signal. HPCI and RCIC were then manually returned to service to control pressure and water level during shutdown. The root cause of this occurrence was failure in the Circulating Water System Multiplex (MUX) system which caused multiple spurious signals to the Circulating Water System components - an equipment failure. Corrective actions include the development of enhanced maintenance and troubleshooting practices and the planned replacement of the Circulating Water MUX system with a hard wired system.

(End of Abstract)

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
Circulating Water System (EIIS Designator:NN)

IDENTIFICATION OF OCCURRENCE

Manual Reactor Scram Following a Loss of All Circulating Water Pumps Due To Malfunction of the Circulating Water System Multiplexer (MUX) - Equipment Failure

Event Date: April 30, 1988
Event Time 0550 Hours and 0853 hours
This LER was initiated by Incident Report No. 88-083 and 88-084

CONDITIONS PRIOR TO OCCURRENCE

IR 88-083: The Plant was in OPERATIONAL CONDITION 1 (Power Operation) at 100% power generating 1085 MWe.

IR 88-084: The Plant was in OPERATIONAL CONDITION 1 (Power Operation) at 55% power generating 600 MWe.

DESCRIPTION OF OCCURRENCE

On April 30, 1988 at 0550 hours, the Circulating Water System began to experience spurious pump discharge valve closures and pump trips. By 0740 hours, two (2) Circulating Water System pumps had tripped, rods were inserted and recirculation flow was reduced to 80% to maintain condenser vacuum. At approximately 0850 hours both 4.16 KVA unit substation Circulating Water System infeeds tripped, placing all Circulating Water System pumps in emergency trip condition, thereby losing all Circulating Water System flow, the reactor was manually scrammed at 0852 hours. The Main Steam Isolation Valves (MSIV) were closed at 0938 hours. All Reactor Feed Pump Turbines were tripped. With the Main Condenser isolated, High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) were placed in service to restore vessel level and remove heat. While both HPCI and RCIC were running, a high reactor water level trip occurred, reactor pressure increased and a Safety/Relief Valve (SRV) lifted at 1004 hours on its low-low set function. RWCU, which had been placed in service to discharge excess reactor coolant, isolated on high differential flow. On the subsequent SRV closure, reactor water level shrank to level 3 and generated an automatic

scram signal. HPCI and RCIC were then manually returned to service to control pressure and water level during shutdown. A four hour report was made to the NRC.

APPARENT CAUSE OF OCCURRENCE

The root cause of this occurrence was failure in the Circulating Water System Multiplex (MUX) system which caused multiple spurious signals to the Circulating Water System components - an equipment failure.

ANALYSIS OF OCCURRENCE

The failure of the MUX system was determined to have been caused by corrosion of card edge connectors. Since the MUX cards employ Complementary Metal Oxide Symmetry (CMOS) circuitry which is highly susceptible to static damage from improper handling, the cards in the system are not routinely removed for edge connector cleaning and/or inspection. Nevertheless all connections and cards on the MUX monitor panel were cleaned during the troubleshooting efforts and the system was returned to service.

Two weeks after this event, the MUX system problem recurred. The problem was resolved by the replacement of two MUX cards in the terminal station.

PREVIOUS OCCURRENCES

There have been no previous similar failures of the MUX systems at Hope Creek.

SAFETY ASSESSMENT

The plant operators manually scrammed the reactor prior to reaching the automatic scram setpoint because of the demonstrated unreliability of the Circulating Water System over the past two hour period. All safety systems used in effecting an orderly shutdown performed their design function. For these reasons, the health and safety of the public were not compromised by this event.

REPORTABILITY

This report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

CORRECTIVE ACTIONS

1. The manufacturer of the Circulating Water MUX System is being contacted regarding the development of enhanced maintenance and troubleshooting practices.

CORRECTIVE ACTIONS (CONTINUED)

2. The planned replacement of the Circulating Water MUX system with a hard wired system is under investigation.

Sincerely,

/s/ S. LABRUNA
S. LaBruna
General Manager -
Hope Creek Operations

AME:

SORC Mtg. 88-110

PSE&G
Public Service Electric and Gas Company P.O. Box L Hancocks Bridge, New Jersey 08038

Hope Creek Operations

August 10, 1988

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
UNIT NO. 1
LICENSEE EVENT REPORT 88-012-01

This revised Licensee Event Report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,

/s/ S. LABRUNA
S. LaBruna
General Manager -
Hope Creek Operations

AME:

Attachment
SORC Mtg. 88-110

C Distribution

The Energy People

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